

High Capacity Anodes for Advanced Lithium Ion Batteries, Phase I

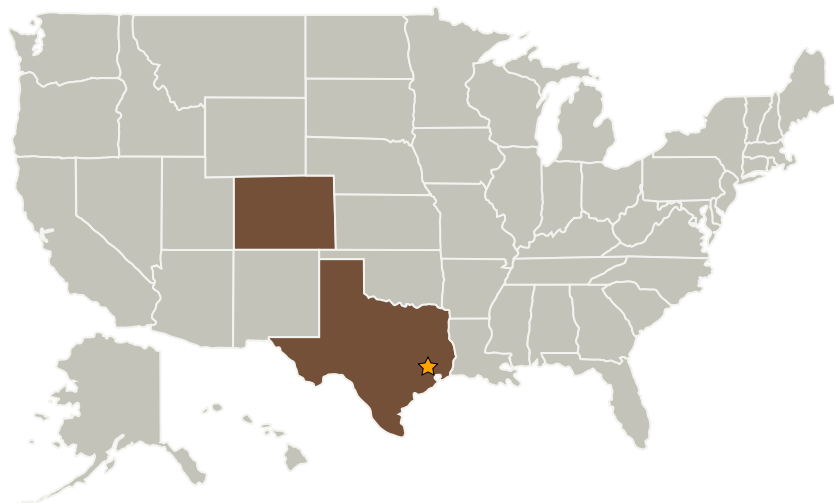
Completed Technology Project (2009 - 2009)



Project Introduction

Lithium-ion batteries are slowly being introduced into satellite power systems, but their life still presents concerns for longer duration missions. Future NASA goals for returning to the Moon and the manned exploration of Mars will demand increased specific energy and life from batteries. The properties of the graphite anode, and in particular the 'solid electrolyte interface' (SEI) layer, are key focus areas for advancement. Improving the lithium-ion (Li-ion) battery anode for both life and specific energy are the goals of this proposed research. Nanocomposite Carbon/Silicon anodes for Li-ion batteries will be produced that can be safely used at high charge/discharge rates, have high specific capacity and a long cycle life. Silicon nanoparticles will be contained in an engineered nanoporous carbon matrix and have room to expand and contract, thus preventing deleterious interphase formation. Phase I is expected to achieve a TRL of 2 and will demonstrate the performance and feasibility of the new anode. Phase II will achieve a TRL of 3 and will successfully scale up the synthesis as well as demonstrate improved performance with commercial cell prototypes.

Primary U.S. Work Locations and Key Partners



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Organizational
Responsibility**Responsible Mission
Directorate:**

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
TDA Research, Inc.	Supporting Organization	Industry	Wheat Ridge, Colorado

Primary U.S. Work Locations	
Colorado	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.2 Energy Storage
 - └ TX03.2.1 Electrochemical: Batteries